

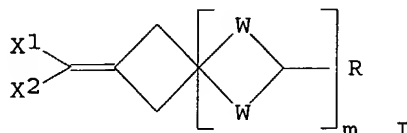
(preparation of fluoroalkenyl compds. with high elastic constant ratio and low viscosity for liq.-crystal displays)

L6 ANSWER 4 OF 8 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1996:220970 CAPLUS
 ED Entered STN: 16 Apr 1996
 TI **Spiro[3.3]heptane** as a structural element for **liquid crystals**.
 AU Sadler, J. David; Kaszynski, Piotr
 CS Department Chemistry, Vanderbilt University, Nashville, TN, 37235, USA
 SO Book of Abstracts, 211th ACS National Meeting, New Orleans, LA, March 24-28 (1996), ORGN-366 Publisher: American Chemical Society, Washington, D. C.
 CODEN: 62PIAJ
 DT Conference; Meeting Abstract
 LA English
 AB It has been demonstrated that some derivs. of **spiro[3.3]heptane** form **liq. crystals**, although with relatively low isotropization temps. Ti. In our research, we address two not studied before aspects of this spiro ring system in **liq. crystals**: 1) the relationship of axial chirality of 1 and 2 and their twisting power, and 2) the influence of two endocyclic double bonds in 2 on Ti and the chemical stability of the mesogens. The first chiral mesogenic derivative 1 shows relatively high twisting power for a nematic host. Derivs. 2 show higher Ti as compared to that of 1 but their chemical stability is significantly reduced. We will present the synthesis of several derivs. 1 and 2, their mesomorphic properties, calculated and exptl. thermal rearrangement data, and the twisting power of chiral derivs. 1 in nematic and smectic hosts.

L6 ANSWER 5 OF 8 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1994:508184 CAPLUS
 DN 121:108184
 ED Entered STN: 03 Sep 1994
 TI Preparation of methylenespiroalkanes as **liquid crystal** components
 IN Poetsch, Eike; Finkenzeller, Ulrich; Binder, Werner
 PA Merck Patent GmbH, Germany
 SO Ger. Offen., 18 pp.
 CODEN: GWXXBX
 DT Patent
 LA German
 IC ICM C07C025-24
 ICS C07C022-08; C07C023-20; C07C013-32; C07C043-225; C09K019-32; G02F001-13; G09F009-35
 CC 25-2 (Benzene, Its Derivatives, and Condensed Benzenoid Compounds)
 Section cross-reference(s): 74, 75

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 4235975	A1	19940428	DE 1992-4235975	19921024
PRAI	DE 1992-4235975		19921024		
OS	MARPAT 121:108184				
GI					



AB Title compds [I; R = Z1A1(Z2A2)nR1; A1,A2 = (fluoro)-1,4-C6H4 in which 1 or 2 CH may be replaced by N, (cyano)-1,4-cyclohexylene in which 1 or 2 CH2 may be replaced by O or S, etc.; R1 = alk(en)yl(oxy); W = CH2, CH2CH2; X1,X2 = H, F, Cl, CF3, alkyl; Z1,Z2 = bond, CO2, CH2O, CH2CH2, C.tplbond.C, etc.; m = 1-3; n = 0,1,4] were claimed. 2-[4-(Trans-4-propylcyclohexyl)phenyl]-6-(difluoromethylene)**spiro**[3.3]**heptane** had K 71 N(66 1), $\Delta n = 0.116$, $\Delta \epsilon = 3.88$.

ST methylenespiroalkane prepn liq crystal component

IT **Liquid crystals**
(methylenespiroalkanes)

IT Optical imaging devices
(electrooptical liq.-crystal, methylenespiroalkanes as components for)

IT 156749-20-1P 156749-21-2P 156749-22-3P 156749-23-4P
RL: SPN (Synthetic preparation); PREP (Preparation)
(preparation of, as liq. crystal component)

L6 ANSWER 6 OF 8 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1989:448628 CAPLUS

DN 111:48628

ED Entered STN: 05 Aug 1989

TI Synthesis and **liquid crystal** properties of dimethylene linked compounds incorporating the cyclobutane or **spiro**[3.3]**heptane** rings

AU Chan, L. K. M.; Gemmell, P. A.; Gray, G. W.; Lacey, D.; Toyne, K. J.

CS Sch. Chem., Univ. Hull, Hull, HU6 7RX, UK

SO Molecular Crystals and Liquid Crystals (1989), 168, 229-45
CODEN: MCLCA5; ISSN: 0026-8941

DT Journal

LA English

CC 75-11 (Crystallography and Liquid Crystals)
Section cross-reference(s): 25

AB The preparation of 16 dimethylene-like compds. is described and a comparison is made between the transition temps. of these compds. and those of the corresponding esters. This comparison once again highlights the fact that the cyclobutane ring should be regarded, in terms of its ability to promote nematic thermal stability, as a chain stiffener rather than as a ring system. A comparison is also made of the nematic thermal stabilities of the trans-cyclobutane and the **spiro**[3.3]**heptane** systems and of the trans-cyclohexane and the **spiro**[5.5]undecane systems.

ST mesophase transition cyclobutane spiroheptane methylene deriv

IT **Liquid crystals**
(dimethylene linked compds. containing cyclobutane or spiroheptane, preparation and transition temps. of)

IT Hydrogenation
(of cyclobutyl- or spiroheptyl-ethanoic acids)

IT Cyanation
(of cyclobutyl- or spiroheptyl-methanols and bromobiphenylethanes)

IT 74-90-8
RL: PRP (Properties)
(cyanation, of cyclobutyl- or spiroheptyl-methanols and bromobiphenylethanes)

IT 1333-74-0
RL: PRP (Properties)
(hydrogenation, of cyclobutyl- or spiroheptyl-ethanoic acids)

IT 104661-18-9P 104661-19-0P 104661-20-3P 104661-21-4P 104661-22-5P
104661-23-6P 121609-66-3P 121609-70-9P 121609-71-0P
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(liq. crystal, preparation and transition temps. and cyanation of)

IT 104661-14-5P 104661-15-6P 104661-34-9P 104661-35-0P 104661-36-1P
 121609-62-9P 121609-63-0P
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
 (liq. crystal, preparation and transition temps. and
 hydrogenation of)

IT 104661-26-9P 104661-27-0P 104661-28-1P 104661-29-2P 104661-30-5P
 104661-31-6P 104661-39-4P 104661-40-7P 104661-41-8P 104686-28-4P
 104686-29-5P 104686-30-8P 104686-31-9P 104686-32-0P 104686-37-5P
 104686-38-6P 104712-17-6P 121609-34-5P 121609-35-6P 121609-36-7P
 121609-37-8P
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
 (liq. crystal, preparation and transition temps. of)

IT 104660-98-2 104661-14-5 104661-22-5 104686-09-1 104686-21-7
 104686-26-2 121609-72-1 121609-73-2
 RL: PRP (Properties)
 (liq. crystals)

IT 4426-03-3P, Cyclobutaneacetonitrile 121609-74-3P 121609-75-4P
 121609-76-5P 121609-77-6P 121609-78-7P 121609-79-8P 121609-80-1P
 121609-81-2P
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
 (preparation and b.p. of)

IT 104661-37-2P 104661-38-3P 104686-36-4P
 RL: SPN (Synthetic preparation); PREP (Preparation)
 (preparation and phase transition temps. of)

IT 4415-82-1P, Cyclobutanemethanol 24070-81-3P 88790-56-1P 121609-38-9P
 121609-39-0P 121609-40-3P 121609-41-4P 121609-42-5P 121609-43-6P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
 (Reactant or reagent)
 (preparation and reaction of, with toluenesulfonyl chloride followed by
 cyanation)

IT 6540-33-6P, Cyclobutaneacetic acid 121609-44-7P 121609-45-8P
 121609-46-9P 121609-47-0P 121609-48-1P 121609-49-2P 121609-50-5P
 121609-51-6P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
 (Reactant or reagent)
 (preparation and reduction or bromination of)

IT 104661-33-8P 104685-92-9P 121609-52-7P 121609-53-8P 121609-54-9P
 121609-55-0P 121609-58-3P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
 (Reactant or reagent)
 (preparation and transition temps. and hydrogenation of)

L6 ANSWER 7 OF 8 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1988:29812 CAPLUS

DN 108:29812

ED Entered STN: 23 Jan 1988

TI **Liquid-crystalline** compounds containing
 tricyclo(4.4.0.03,8)decane (twistane) and **spiro(3.**
3)heptane ring systems

AU Geivandov, R. Ch.; Lastochkina, S. O.; Goncharova, I. V.; Bolotin, B. M.;
 Karamysheva, L. A.; Geivandova, T. A.; Ivashchenko, A. V.; Titov, V. V.

CS Org. Intermed. Dyes Inst., Moscow, 103787, USSR

✓ SQ ~~Liquid Crystals (1987), 2(2), 235-9~~
 CODEN: LICRE6; ISSN: 0267-8292

DT Journal

LA English

CC 75-11 (Crystallography and Liquid Crystals)

AB A new series of **liq.-cryst.** materials containing the
 tricyclo(4.4.0.03,8)decane (twistane) and further examples of materials
 containing the **spiro(3.3)heptane**
 system were prepared and their thermal properties examined The mesomorphic
 properties are compared with those of the benzene, trans-cyclohexane, and
 bicyclo(2.2.2)octane derivs. The replacement of the benzene ring in
 related compds. by the twistane ring results in a lowering of the melting

and the clearing points as well as a narrowing of the mesophase interval.
The esters of **spiro(3.3)heptane**
exhibit smectic mesophases with a narrow temperature interval.

ST mesophase tricyclodecane spiroheptane ring; tricyclodecane ring
liq crystal prepn property; spiroheptane ring
liq crystal prepn property

IT **Liquid crystals**

(spiroheptane and tricyclodecane ring-containing, preparation and properties of)

IT 99470-24-3 112084-14-7

RL: PRP (Properties)

(**liq. crystal** properties of)

IT 110505-40-3P 110505-41-4P 110505-42-5P 110505-43-6P 110505-44-7P

110518-90-6P 110518-91-7P 112084-15-8P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(preparation and **liq. crystal** properties of)

L6 ANSWER 8 OF 8 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1987:609482 CAPLUS

DN 107:209482

ED Entered STN: 27 Nov 1987

TI Synthesis and **liquid crystal** properties of compounds
incorporating cyclobutane, **spiro[3.3]**
heptane and dispiro[3.1.3.1]decane rings

AU Chan, L. K. M.; Gemmell, P. A.; Gray, G. W.; Lacey, D.; Toyne, K. J.

CS Dep. Chem., Univ. Hull, HU6 7RX, UK

✓ SO Molecular Crystals and Liquid Crystals (1987), 147, 113-39

CODEN: MCLCA5; ISSN: 0026-8941

DT Journal

LA English

CC 75-11 (Crystallography and Liquid Crystals)

AB A number of esters of R-X-CO₂-p-C₆H₄-p-C₆H₄-Y (I) incorporating the
cyclobutane, **spiro[3.3]heptane**, or
dispiro[3.1.3.1]decane rings was prepared using a di-Et malonate synthesis.
Strict comparison of the **liq. crystal** behavior among
the 3 classes containing a terminal CN-substituent was not possible because
both the cyclobutanes and dispiro[3.1.3.1]decanes are mixts. of cis- and
trans-isomers; the **spiro[3.3]**
heptanes are racemic systems. Using preparative hplc, it was
however possible to isolate the pure cis- and trans-isomers of 2 of the
CN-substituted cyclobutane esters (I; R = alkyl, -X- = -.box.-, Y = CN).
From the phys. data and the results for the corresponding **spiro[3.3]heptane**
esters, conclusions regarding the
effects of these ring systems on **liq. crystal** behavior
were obtained. The pure cis- and trans-isomers of the cyclobutane ester
(I, R = C₃H₇, -X- = -.box.-, Y = CN) were assessed for the trends in both
order parameter and viscosity with temperature; the results support the idea
that the trans-cyclobutane ring adopts a more planar conformation at
higher temps.

ST mesophase biphenyl cyclobutane spiroheptane spirodecane

IT **Liquid crystals**

(cyanobiphenyl derivs. containing cyclobutane or spiroheptane or
dispirodecane rings, preparation and properties of)

IT Birefringence

(of cyanobiphenyl derivs. containing cyclobutane or spiroheptane or
dispirodecane **liq. crystals**)

IT Isomerization

(cis-trans, in cyanobiphenyl derivs. containing cyclobutane or spiroheptane
or dispirodecane rings, **liq. crystal** properties in
relation to)

IT 104660-58-4P 104660-69-7P 104660-83-5P 104660-84-6P 104660-85-7P
104660-88-0P 104661-43-0P 104685-91-8P 111195-36-9P 111195-37-0P
111195-38-1P 111195-39-2P 111195-40-5P 111195-41-6P 111195-42-7P
111195-43-8P 111195-44-9P 111195-45-0P 111195-46-1P 111195-47-2P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(**liq. crystal**, preparation and properties of)

IT 1781-54-0P 1781-55-1P 20939-62-2P 66016-02-2P 66016-03-3P
66016-04-4P 104660-77-7P 104660-78-8P 104660-79-9P 104660-80-2P
104660-81-3P 104660-82-4P

RL: SPN (Synthetic preparation); PREP (Preparation)
(preparation and acidification of, in **liq. crystal**
preparation)

IT 24330-53-8P 24330-55-0P 86103-44-8P 88790-52-7P 104660-71-1P
104660-72-2P 104660-73-3P 104660-74-4P 104660-75-5P 104660-76-6P
111241-41-9P 111241-42-0P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
(Reactant or reagent)

(preparation and crystallization and reaction of, with diethylmalonate in
liq. crystal preparation)

IT 2163-42-0P 2612-29-5P 21398-43-6P 104660-60-8P 104660-61-9P
104660-62-0P 104660-63-1P 104660-64-2P 104660-65-3P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
(Reactant or reagent)

(preparation and crystallization and reaction of, with toluenesulfonyl
chloride in

liq. crystal preparation)

IT 57252-83-2P 66016-16-8P 66016-17-9P 66016-18-0P 66016-19-1P
88790-53-8P 111196-18-0P 111196-19-1P 111196-20-4P 111196-21-5P
111196-22-6P 111196-23-7P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
(Reactant or reagent)

(preparation and esterification of, in **liq. crystal**
preparation)